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09/726,640	11/30/2000	Martin Feldman	0026 Feldman	6091

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PATENT DEPARTMENT  
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EXAMINER

KAO, CHIH CHENG G

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/726,640

Applicant(s)

FELDMAN ET AL.

Examiner

Chih-Cheng Glen Kao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-6, 16, 17, 19, 22-24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. (US Patent 6134031) in view of Christensen et al. (US Patent 6326600) and Healey et al. (US Patent 5013140).
2. With regards to claim 1, Nishi et al. discloses an apparatus for optically switching light comprising a series of input polarization-dependent angular deflectors, wherein the angle by which each deflector deflects is a function of the polarization of the incident light (Fig. 1 and 26, 1b, left half, and col. 5, lines 40-45), an array of input polarization control elements associated with each deflector wherein it controls the degree to which polarization of light transmitted through is altered (Fig. 1, 1a, and col. 5, lines 33-40), wherein said input polarization control arrays and input deflectors are positioned so that a first input polarization control array transmits light (Fig. 1 and 26, 1a) through the input polarization control elements to a first input deflectors (Fig. 1 and 26, 1b), and so that subsequent control arrays (Fig. 1 and 26, 1a) from preceding input deflectors (Fig. 1 and 26, 1b) can transmit light through input polarization control elements of the subsequent input polarization control array (Fig. 1 and 26, 1a) and so the last input

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deflector is adapted to transmit light (Fig. 1 and 26, 1b), and wherein the apparatus is adapted to allow switching from any source to any receiver (Fig. 1 and 26), by using input controllers for polarization by inputs of the polarization control elements (Fig. 1 and 26, 1a) as light enters each input deflector (Fig. 1 and 26, 1b), so that the net direction of deflection of light caused by all deflectors is a function of the directions of polarization of light as each passes through each deflector, causing light to be directed (Fig. 1 and 26, and col. 5, lines 25-45).

However, Nishi et al. does not disclose light sources and receivers nor a net angular deflection of light caused by deflectors to be directed to the receiver.

Christensen et al. teaches light sources and receivers (col. 4, lines 50-55 and Fig. 5). Healey et al. teaches a net angular deflection of light caused by deflectors to be directed to the receiver (Fig. 3).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the light sources and receivers of Christensen et al. with the device of Nishi et al., since one would be motivated to have sources to send a light signal and receivers to detect a signal to see what information the signal has as implied from Christensen et al. (Fig. 5).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the deflection of Healey et al. with the device of Nishi et al., since one would be motivated to incorporate this as a means of optically switching information at a greatly increased rate as shown by Healey et al. (col. 1, lines 33-40).

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3. With regards to claim 2, Nishi et al. further discloses a series of output polarization-dependent angular deflectors, wherein the angle by which each deflector deflects is a function of the polarization of the incident light (Fig. 1 and 26, 1b, right half, and col. 5, lines 40-45), an array of output polarization control elements associated with each deflector wherein it controls the degree to which polarization of light transmitted through is altered (Fig. 1 and 26, 1a, and col. 5, lines 33-40), wherein said output polarization control arrays and output deflectors are positioned so that a first output polarization control array transmits light (Fig. 1 and 26, 1a) from the last input deflector (Fig. 1 and 26, 1b, left half) through the output polarization control elements to a first output deflectors (Fig. 1 and 26, 1b, right half), and so that subsequent control arrays (Fig. 1 and 26, 1a) from preceding output deflectors (Fig. 1 and 26, 1b) can transmit light through output polarization control elements of the subsequent output polarization control array (Fig. 1 and 26, 1a) and so the last output deflector is adapted to transmit light (Fig. 1 and 26, 1b).

4. With regards to claim 3, Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose a first single lens to collimate or focus light from the last input deflector and a second single lens to focus light entering the output array, so that light is focused as it impinges on receivers.

Christensen et al. further teaches a first single lens to collimate or focus light from the first optical array (Fig. 5, #590) and a second single lens to focus light entering the output array, so that light is focused as it impinges on receivers (Fig. 5, #595).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the lenses with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since one would be motivated to have lens in order to transmit signals across distances as implied from Christensen et al. (Fig. 5).

5. With regards to claim 4, Nishi et al. further discloses the output deflectors and control elements are substantially complementary to the input deflectors and control elements (Fig. 22).

6. With regards to claim 5, Nishi et al. further discloses the output deflectors and control elements are not substantially complementary to the input deflectors and control elements (Fig. 19).

7. With regards to claim 6, Nishi et al. further discloses control elements set so two lights are directed normally to one light receiver at polarization orthogonal to one another (Fig. 1).

8. With regards to claim 16, Nishi et al. further discloses the apparatus adapted to switch light from an input to output array adjacent to each other (Fig. 28).

9. With regards to claim 17, Nishi et al. further discloses two apparatus comprising a fast optical switch (Fig. 28, #27) to direct light from an input array to one of said apparatuses (Fig. 28).

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10. With regards to claim 19, Nishi et al. further discloses the device directing light from one input array to two output arrays (Fig. 28).

11. With regards to claims 22-24, Nishi et al. further discloses the device adapted to direct light from a one or two-dimensional input array to a one or two-dimensional output array (Fig. 28).

12. With regards to claim 26, Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose deflectors differing in strength.

Healey et al. teaches deflectors differing in strength (col. 2, lines 47-50, and col. 3, lines 22-24).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have deflectors of different strength with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since one would be motivated use this to create different possible increments of displacement as shown by Healey et al. (col. 3, lines 24-26).

13. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healy et al. as applied to claim 1 above, and further in view of Welch et al. (US Patent 5255332)

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

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However, Nishi et al. does not disclose a single mode input and output fibers.

Welch et al. further teaches single mode input and output fibers (col. 3, lines 65-67, and col. 4, lines 45-50).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the single mode fibers of Welch et al. with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since one would be motivated to have these fibers to carry the signal to another location as implied from Welch et al. (Fig. 1).

14. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 above, and further in view of Wu et al. (US patent 6005697).

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose twisted nematic or ferroelectric liquid crystal for polarization control.

Wu et al. teaches twisted nematic or ferroelectric liquid crystal for polarization control (col. 5, lines 19-32).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have liquid crystals of Wu et al. with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since these polarization controllers are art-recognized equivalents as implied from Wu et al. (col. 5, lines 19-32). It would have been within



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general skill in the art to substitute one for another. One would be motivated to use these rotators for their quick switching speeds as implied from Wu et al. (col. 5, lines 19-32).

15. Claims 10, 11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 and 17 above, and further in view of Hait (US Patent 6477287).

16. With regards to claims 10 and 11, Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose using Pockels or Kerr for polarization control.

Hait teaches Pockels or Kerr for polarization control (col. 5, lines 18-22).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have Pockels or Kerr for polarization control of Hait with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since these polarization controllers are art-recognized equivalents as implied from Hait. (col. 5, lines 19-32). It would have been within general skill in the art to substitute one for another. One would be motivated to use these to provide a means for switching signals from one location to another as implied from Hait (col. 5, lines 18-22 and Fig. 2).

17. With regards to claim 18, Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

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Nishi et al. further discloses the optical switch with a polarizer and a polarizing beam splitter (Fig. 28, #27, and Fig. 1).

However, Nishi et al. does not disclose using Pockels or Kerr for polarization control.

Hait teaches Pockels or Kerr for polarization control (col. 5, lines 18-22).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have Pockels or Kerr for polarization control of Hait with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since these polarization controllers are art-recognized equivalents as implied from Hait. (col. 5, lines 19-32). It would have been within general skill in the art to substitute one for another. One would be motivated to use these to provide a means for switching signals from one location to another as implied from Hait (col. 5, lines 18-22 and Fig. 2).

18. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 above, and further in view of Gievers (US Patent 3692385) and Patel et al. (US Patent 5414540).

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose a Wollaston or Rochon prism in the polarization control path.

Gievers teaches a Wollaston and Rochon prism (col. 7, lines 64-69). Patel et al. teaches a Wollaston prism in a switch as a polarization control path (col. 6, lines 15-26).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the Wollaston prisms in a switch of Patel et al. with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since the deflectors of Nishi et al. and the Wollaston prisms of Patel et al. are considered as art-recognized equivalents in that they both route light. One would be motivated to these prisms for its advantageous alternative design, which include total internal reflection as implied from Patel et al. (col. 6, lines 15-26), which may reduce optical loss of a signal.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the Rochon or Wollaston prisms of Gievers with the suggested device of Nishi et al. in view of Christensen et al., Healey et al., and Patel et al., since the prisms of Gievers and Nishi et al. are considered as art-recognized equivalents in that they both route polarized light. One would be motivated to use these elements since they are the best known polarizers for routing light as implied from Gievers (col. 7, lines 64-69, and Fig. 2).

19. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 above, and further in view of Patel et al.

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above. Nishi et al. further discloses a birefringent crystal (Fig. 22, #17, and col. 33, lines 14-19) with an optical path control (Fig. 22, #20).

However, Nishi et al. does not disclose a prism in the polarization control path.

Patel et al. teaches a prism in a switch as a polarization control path (col. 6, lines 15-26).

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It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the prism in a switch of Patel et al. with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since the deflectors of Nishi et al. and the prism of Patel et al. are considered as art-recognized equivalents in that they both route light. One would be motivated to these prisms for its advantageous alternative design, which include total internal reflection as implied from Patel et al. (col. 6, lines 15-26), which may reduce optical loss of a signal.

20. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 above, and further in view of Shirasaki (US Patent 4392722) and Schleipen (US Patent 5930044).

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose dimensions and spacing of deflectors and dimensions of polarization elements as such that there is negligible crosstalk.

Shirasaki teaches dimensions of polarization elements as such that there is negligible crosstalk (col. 1, lines 65-67 to col. 2, lines 1-3). Schleipen teaches dimensions and spacing requirements of deflectors based on crosstalk (col. 4, lines 5-15).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have dimensions of polarization elements to cause negligible crosstalk of Shirasaki with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al.,

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since one would be motivated to minimize transmission loss as implied from Shirasaki (col. 2, lines 1-3).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have dimensions of deflectors of Schleipen to cause negligible crosstalk with the suggested device of Nishi et al. in view of Christensen et al., Healey et al., and Shirasaki, since one would be motivated for the best resolution as implied from Schleipen (col. 4, lines 5-15).

21. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 above, and further in view of Schroder (US Patent 3976360).

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not disclose each input deflector having an angular deflection about twice the angular deflection of the preceding deflector.

Schroder teaches each input deflector having an angular deflection about twice the angular deflection of the preceding deflector (Fig. 1).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to double angular deflection of Schroder with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since one would be motivated to create multiple directions to send a signal in a switch as implied from Schroder (col. 2, lines 35-45).

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22. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Christensen et al. and Healey et al. as applied to claim 1 above, and further in view of Fatehi et al. (US Patent 6002818).

Nishi et al. in view of Christensen et al. and Healey et al. suggests a device as recited above.

However, Nishi et al. does not multi-mode output fibers.

Fatehi et al. teaches multi-mode output fibers (col. 5, lines 50-54).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have multi-mode fibers of Fatehi et al. with the suggested device of Nishi et al. in view of Christensen et al. and Healey et al., since one would be motivated use these fibers in order to process more information simultaneously compared to single-mode fibers as implied from Fatehi et al. (col. 5, lines 50-54).

### ***Response to Arguments***

23. Objections to the claims and drawings made of record on 3/27/03 have been withdrawn in light of the arguments and amendments made of record on 6/26/03.

24. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection. Furthermore, with regards to Christensen et al., Christensen et al. further discloses the device useable in switches (col. 7, lines 38-43).

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*Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (703) 605-5298. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
gk

  
**DAVID V. BRUCE**  
**PRIMARY EXAMINER**